Horse personality: Variation between breeds

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Abstract

Anecdotal evidence from horse owners and handlers suggests the existence of breed typical behaviour and personality in horses. This is further supported by current research on heritability of personality characteristics in a range of species. The Horse Personality Questionnaire (HPQ) is a 25-item rating method that has previously been shown to be reliable for the assessment of personality in horses. Principal component analysis on HPQ data has identified six underlying personality components in horses. These are Dominance, Anxiousness, Excitability, Protection, Sociability and Inquisitiveness. Using the HPQ a survey of 1223 horses of eight different breeds was completed. Data were analysed to explore any differences in personality between breeds across the six personality components. Breed differences in personality were identified, and it was noted that variability between breeds varied between personality components. Anxiousness and Excitability showed the most variation between breeds, whilst Dominance and Protection showed the least variance. The results identified breed typical personalities that were comparable to results from previous studies as well as anecdotal evidence provided by the popular equine literature. The results are discussed in terms of the potential selection pressures that may have resulted in these differences.

1. Introduction

Throughout the domestication of the horse (Equus caballus) specific characteristics have been selected for different purposes, resulting in the differentiation of domestic horses into
morphologically distinct types or breeds. Selection may focus on physical attributes such as size, strength and speed (Clutton-Brock, 1999) but may also focus on desirable behaviours (Hislop, 1992; Houpt and Kusunose, 2000).

Breeds are often described as having breed typical behaviours and such claims are supported by anecdotal evidence from breed enthusiasts, with breed societies often promoting a breed by describing its typical temperament and personality. For example, the Highland pony is described as having a “kindly nature and even temperament” (Highland Pony Society, 2006) and the Irish draught horse is described as having “an intelligent and gentle nature and is noted for its docility and sense” (Irish Draught Horse Society of Great Britain, 2006). It is therefore predicted that horse breeds will vary in their personality.

Personality research in both human and nonhuman-animals (from now on referred to as animals) is a rapidly growing area of interest. Personality can be defined as “those characteristics of a person that account for consistent patterns of feeling, thinking and behaving” (Pervin and John, 1997, p. 4). This definition emphasises the importance of consistency in the way an individual behaves and infers that these differences be attributed to the individual, as opposed to the environment (Pervin and John, 1997). There are limits to the application of this definition to animals, as the measurement of how animals feel or think is difficult, if not impossible. Animal personality research has therefore focused on the assessment of observed behaviour in order to demonstrate individual differences.

Recent studies on horse personality have explored the assessment of individual differences through the use of behaviour tests (Le Scolan et al., 1997; Wolff et al., 1997; Visser et al., 2001, 2002, 2003a,b; Seaman et al., 2002) and through the use of ratings provided by handlers (Anderson et al., 1999; Creighton, 2003; Momozawa et al., 2003, 2005). Such studies have demonstrated that reliable assessments of individual differences are achievable and their potential applications have been reviewed (Mills, 1998).

Recently, Lloyd et al. (2007) developed a trait-based assessment method for horse personality. The Horse Personality Questionnaire (HPQ) (see Appendix A) is an adaptation of the Stevenson-Hinde et al. (1980) rhesus macaque (Macaca mulatta) personality rating questionnaire, which had previously been validated on a wide range of animal species (for example: Macaca nemestrina, Caine et al., 1983; Felis catus, Feaver et al., 1986; Gorilla gorilla, Gold and Maple, 1994; Crocuta crocuta, Gosling, 1998; Acinonyx jubatus, Wielebnowski, 1999; Pan troglodytes, Martin, 2005). Using the HPQ Lloyd et al. (2007) assessed the personality of 61 horses and achieved a 72.13% level of agreement between raters. Furthermore ratings were shown to correlate with measures of observed behaviour collected whilst the horses were at grass. Using principal component analysis (PCA) the HPQ data showed six underlying personality components that were used to describe horse personality. These were Dominance, Anxiousness, Excitability, Protection, Sociability and Inquisitiveness (Table 1) and explained 79.3% of the variance.

The resulting component structures were comparable to the five factors identified by Creighton (2003) which had previously been compared to those of the human Big Five (Extraversion, Agreeableness, Emotionality, Openness and Conscientiousness) (e.g. Costa and McCrae, 1992). The personality taxonomies identified by Creighton (2003) and Lloyd et al. (2007) both included elements of Extraversion, Agreeableness, Emotionality, Openness. Similar factors seem to be recurrent in other animal personality studies (Gosling and John, 1999).

Breed differences in horse personality have not been directly tested, some studies, have explored the association between breed and specific behaviours. For example, Hausberger et al. (2004) looked at the reactions of horses from 16 breeds to a bridge test and identified breed
differences in the length of time taken to cross the ‘bridge’. Hausberger and Muller (2002) also found variation in friendly behaviour and reactivity between French saddledbreds, thoroughbreds and Angloarabs. Reactivity, or emotionality, in the horse can be described as a heightened state of arousal (McCall et al., 2006) and may be associated with the Excitability and Anxiousness components of horse personality. Moreover, breed effects have also been identified in the occurrence of stereotypic behaviours (Luescher et al., 1998; Redbo et al., 1998; Houpt and Kusunose, 2000).

In contrast, breed differences in personality and behaviour have been specifically explored in dogs (Canis familiaris). For example, Svartberg (2006) used data from behavioural tests of over 13,000 Swedish dogs from 31 breeds and demonstrated that dog breeds vary significantly in the traits playfulness, curiosity/fearlessness, sociability and aggressiveness. Breed differences in dogs were also explored by Notari and Goodwin (2007) and Bradshaw et al. (1996) who asked veterinarians and dog-care professionals to rank dog breeds on a selection of behavioural traits using their own past experiences. Furthermore, Svartberg (2006) demonstrated that recent selection pressures (mainly breeding for the show ring) have significantly affected breed-typical behaviours in dogs. Both dogs and horses have undergone extensive artificial selection resulting in distinctly different breeds (Clutton-Brock, 1999). It is therefore proposed that as this has resulted in distinct personality differences between dog breeds then it is likely to have had a similar effect on horses.

In addition, it is now well accepted that behaviour and personality are affected to some extent by genes (Bouchard and Loehlin, 2001; Reif and Lesch, 2003; Mormède, 2005; van Oers et al., 2005). Research is beginning to quantify heritability of specific behaviours and personality constructs. For example, Dominance in chimpanzees (Weiss et al., 2000, 2002), exploratory and other behaviours in great tits (Parus major) (Dingemanse et al., 2002; van Oers et al., 2004; Carere et al., 2005), dominance in dogs (Svartberg, 2005; Pérez-Guisado et al., 2006) and temperament in cattle (Gauly et al., 2001) have all been shown to be heritable. This growing evidence of genetic influence on behaviour further supports the hypothesis that breeds may differ in personality.

The present study explores the potential differences in personality between eight different horse breeds using the method of personality assessment previously developed by Lloyd et al. (2007). As shown in a recent survey by Buckley et al. (2004) the temperament, and therefore
personality, of a horse is considered to be an important attribute and was considered a key issue in horse health and performance. Therefore a greater understanding of the typical behaviour and personality of specific horse breeds may aid the selection of horses for specific equine disciplines, including use for leisure by amateur riders. More informed selection of horses should lead to improved horse welfare, as horses are more likely to be selected for appropriate functions and rider capabilities.

2. Materials and methods

Personality data from 1223 horses from eight different horse breeds were collected and compared. The breeds selected were: Irish draught horses (IDH), thoroughbreds (TB), Shetland ponies (Shet.), Arabs, Highland ponies (High.), Welsh ponies and cobs (WPC) (i.e. Welsh sections A, B, C and D), American quarter horses (AQH) and appaloosas (App.). The breeds were selected to represent a variety of breed types that included lightweight, draught and pony breeds.

2.1. Questionnaire design

Horses were assessed using the Horse Personality Questionnaire (Lloyd et al., 2007). The HPQ consisted of 25 behaviourally defined adjectives (traits) (see Appendix A). These were scored on a Likert-type scale (Coolican, 2004) from one to seven. A score of one represented no expression and seven represented extreme expression of each trait.

The HPQ included a worked example and instructions on how to complete the questionnaire. Demographic questions about the focal horse and the person completing the questionnaire were also included so as to ascertain that individuals met the criteria in Section 2.2. The same questionnaire format was used for all breeds.

2.2. Questionnaire distribution

Data collection was ongoing between January 2005 and January 2006. The HPQ was distributed in a variety of ways. Approximately 4000 questionnaires were distributed directly to owners of pure-bred horses either through the relevant breed societies or by direct communication from the authors. The project was also publicised in the newsletters of the relevant breed societies (Table 2). The project and the HPQ were also advertised using articles in the local (Northamptonshire, UK) and British equine press. Respondents were invited to be involved with the project by either completing paper versions of the questionnaire or by completing an online version, which was hosted by Harper Adams University College. This was available via a link on the Moulton College website from May 2005 to December 2005. See Table 2 for the societies involved, number of questionnaires received and the age and gender details for each breed used in this study. Data from mares, stallions and geldings were combined for analysis.

Data were included in analysis if the following criteria were met: (1) horses were a minimum of 1 year of age to allow for some stability in the personality (Visser et al., 2001); (2) respondents had known the horse for a minimum of six months and regularly handled the horse being assessed and (3) horses were pure-bred.

2.3. Calculation of component scores

The component scores for each horse were calculated using the horse personality model produced by Lloyd et al. (2007). The original PCA was carried out with a varimax rotation on data from 44 horses assessed on the 25 traits from the HPQ. Extracted components were determined using the eigenvalue criterion (i.e. extracted components must have an eigenvalue of greater than one), by using scree plots and the amount of variability explained by each component. The six components accounted for 79.3% of the variance within the data. As part of the original PCA component scores for each horse were automatically calculated by SPSS.
As PCA was not carried out in the present study, component scores were calculated using Microsoft Excel. An individual’s score for each component was calculated by: the individual’s rating on an item, multiplied by (the loading of that item divided by the eigenvalue of the component) summed over all trait items. The loading is the calculated input of a trait onto a component and the eigenvalue is the variance accounted for by that component, as calculated during the original PCA (see Lloyd et al., 2007). This was an adaptation of the equation used by Stevenson-Hinde et al. (1980) and Stevenson-Hinde and Zunz (1978) as it does not standardise the rating data prior to calculation of the component scores. Data were not standardised, as all variables were measured on the same scale and therefore did not require balancing for the effects of different measurement scales.

2.4. Statistical analysis

Questionnaire data were manipulated using Excel 2003 (Microsoft) and were analysed using Minitab 13 for Windows and SPSS Version 14 for Windows (SPSS Inc., USA). The aim of the statistical analysis was to explore any differences in component scores between breeds. The value of alpha was set at 0.05 for all statistical tests.

The component scores were compared across all breeds using the Kruskal–Wallis test (Siegel and Castellan, 1988; Dytham, 2003). Post hoc multiple comparisons tests (Siegel and Castellan, 1988) were then carried out on all possible breed pairs (28 in total) to explore specific breed differences on each component.

3. Results

A total of 1223 questionnaires (Table 2) were completed and entered into the analysis. Calculation of a return rate was not appropriate as a result of the combined use of both paper and online questionnaires and therefore the number of possible respondents was unknown. All completed questionnaires were analysed to explore breed differences in personality across the six personality components.

3.1. Differences across all eight breeds

The Kruskal–Wallis tests were carried out for each component comparing the scores of all eight breeds. The results indicated that there were significant differences in component scores between breeds for all six of the components (Table 3).
Table 3
Average component scores for each breed with $X^2$ values from Kruskal–Wallis test and summary of between breed differences (multiple comparison tests, Siegel and Castellan, 1988)

<table>
<thead>
<tr>
<th>Medians (IQR)</th>
<th>$X^2$</th>
<th>Summary of between breed differences$^a$</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDH</td>
<td>–1.50 (1.71)</td>
<td></td>
</tr>
<tr>
<td>TB</td>
<td>–0.62 (0.86)</td>
<td></td>
</tr>
<tr>
<td>Shet</td>
<td>–1.40 (1.96)</td>
<td></td>
</tr>
<tr>
<td>Arab</td>
<td>–1.14 (1.87)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>–1.16 (2.14)</td>
<td></td>
</tr>
<tr>
<td>WPC</td>
<td>–1.08 (1.59)</td>
<td></td>
</tr>
<tr>
<td>App.</td>
<td>–1.24 (1.98)</td>
<td></td>
</tr>
<tr>
<td>AQH</td>
<td>–1.21 (1.43)</td>
<td></td>
</tr>
<tr>
<td>Dominance</td>
<td>–1.40 (1.96)</td>
<td>46.60 *** TB, WPC$^{ab}$, AQH$^{ab}$, App$^b$, Arab$^b$, High$^{ab}$, Shet$^b$, IDH$^b$</td>
</tr>
<tr>
<td>Anxiousness</td>
<td>1.27 (2.14)</td>
<td>110.84 *** TB, WPC$^{ac}$, Arab$^c$, AQH$^{ad}$, IDH$^{bd}$, Shet$^{bd}$, App$^b$, High$^{bd}$</td>
</tr>
<tr>
<td>Excitability</td>
<td>4.02 (2.18)</td>
<td>165.52 *** TB, Arab$^a$, WPC$^a$, Shet$^c$, AQH$^c$, App$^b$, High$^{bc}$, IDH$^{bd}$</td>
</tr>
<tr>
<td>Protection</td>
<td>6.15 (2.42)</td>
<td>26.47 ** Arab$^a$, IDH$^{ab}$, High$^{ab}$, Shet$^{ab}$, App$^{ab}$, TB$^{a}$, AQH$^{a}$, WPC$^{a}$</td>
</tr>
<tr>
<td>Sociability</td>
<td>6.97 (2.40)</td>
<td>47.83 *** Arab$^a$, WPC$^{a}$, Shet$^{ad}$, AQH$^{ad}$, IDH$^{ad}$, WPC$^{a}$, App$^{ab}$, High$^{ab}$, IDH$^{ad}$, AQH$^{ad}$</td>
</tr>
<tr>
<td>Inquisitiveness</td>
<td>8.67 (3.04)</td>
<td>41.99 *** Arab$^a$, WPC$^{a}$, Shet$^{ad}$, AQH$^{ad}$, IDH$^{ad}$, AQH$^{ad}$</td>
</tr>
</tbody>
</table>

$^a$ Medians significantly different (multiple comparisons tests, $P < 0.05$) where at least one superscript differs, breeds shown in rank order, highest to lowest (according to mean ranking in Kruskal–Wallis test). IQR, Interquartile range; IDH, Irish draught horse; TB, thoroughbred; Shet., Shetland pony; High., Highland pony; WPC, Welsh ponies and cobs; App., appaloosa; AQH, American quarter horse.

** $P < 0.001$ (Kruskal–Wallis test).

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3.2. Breed differences

Multiple comparisons tests performed for each component identified a total of 48 significant differences in personality scores between breeds. A total of 28 different breed pair combinations were possible from the eight horse breeds. Variability within personality components was quantified by how many of the 28 pairs were significantly different. The highest levels of variability were found on Excitability (14/28 breed pairs significantly different) and Anxiousness (14/28 breed pairs significantly different). Dominance (4/28 breed pairs significantly different) and Protection (2/28 breed pairs significantly different) had the lowest variability. Sociability (8/28 breed pairs significantly different) and Inquisitiveness (6/28 breed pairs significantly different) both had moderate to low variability. For each component the breeds were ranked according to their mean ranks calculated during the Kruskal–Wallis test. These are shown in Table 3, where the significant differences between breed pairs (identified by the multiple comparisons tests) are also identified. Table 3 also provides a basic representation of each breed’s typical personality. For example, in comparison to the other breeds, the TB had high scores on the components Dominance, Anxiousness, Excitability, Sociability and Inquisitiveness, but had moderately low scores on Protection. In contrast the IDH had low scores on the components Dominance, Excitability, Sociability and Inquisitiveness, with moderately low scores on Anxiousness and a high score on Protection.

The breed pair that demonstrated the highest level of personality difference was TB versus IDH, which significantly differed in scores on all personality components except Protection.

4. Discussion

The results demonstrated that differences in personality do exist between the eight horse breeds assessed in this study, although not all breed pairs were significantly different. Differences between breeds varied across the six personality components, with Anxiousness and Excitability demonstrating the most variability and Dominance and Protection showing low levels of variability. The following discussion explores this variation in horse personality and relates it to the potential selective processes that may have influenced it. The assessment strategy utilised in this study is also discussed in terms of reliability and validity.

4.1. Personality assessment

The trait theory approach utilised in this study is well accepted within personality research in both humans and animals (e.g. Stevenson-Hinde et al., 1980; Caine et al., 1983; Feaver et al., 1986; Costa and McCrae, 1992; Gold and Maple, 1994; Loehlin et al., 1998; McCrae and Costa, 2004; Martin, 2005). Trait theory is based on the lexical hypothesis that the most socially relevant and important personality characteristics are encoded in the natural language (John, 1990) and are often referred to as traits. Such assessments involve a list of traits upon which the individual is rated using a Likert-type scale from one to five, for example (e.g. Coolican, 2004). The assessment of personality in this manner and subsequent analysis using multivariate statistics allows for a detailed exploration of personality taxonomy (i.e. the grouping of similar or related personality traits into specific categories or dimensions) of the species being studied. This in turn allows for a more simplified interpretation of an individual’s personality.

In terms of animal personality research this approach is not without criticism. The use of terms such as those used in the HPQ has been criticised by some as being anthropomorphic (Kennedy,
Gosling and John (1999), however, argue against this concern. In their review of the animal personality literature, it was demonstrated that independent observers were able to agree about the personality ratings of individuals. Secondly many of the studies they reviewed utilised detailed behavioural observations and yielded results comparable to those using rating methods and anthropomorphic terms (e.g. Mather and Anderson, 1993; Sinn et al., 2001). Furthermore, it has been noted that the use of anthropomorphic terms is more practical, especially, for example, when all one may need to know is whether an animal is agreeable or not (Gosling, 1998), as opposed to a breakdown of its usual behaviours. For example, Hebb (1946) reported on the use of a behavioural recording system in which specific behavioural acts of captive chimpanzees (*Pan troglodytes*) were recorded in order to provide an objective description of each individual’s personality. The extensive list that was produced, however, had very little meaning. In contrast, it was found that the use of anthropomorphic descriptors to describe the general peculiarities of the individuals was far more useful than the complicated lists of behaviours, especially for new members of staff. It was therefore concluded that the use of anthropomorphic terms provided “an intelligible and practical guide to behaviour” (Hebb, 1946, p. 88). Furthermore, animal personality research using trait based assessment methods has been found to be practical, reliable and valid (Gosling and Vazire, 2002).

For the present study it was important that a reliable and valid method of assessment was utilised for the measurement of horse personality. The HPQ was previously tested for these by Lloyd et al. (2007) using criteria set out by Gosling and Vazire (2002). In their review of the animal personality literature, Gosling and Vazire (2002) discussed animal personality research with reference to three major criteria derived from Kenrick and Funder’s (1988) review of human personality literature. These criteria were: “(1) assessments by independent observers must agree with one another; (2) these assessments must predict behaviours and real-world outcomes; and (3) observer ratings must be shown to reflect genuine attributes of the individuals rated and not merely the observers’ implicit personality theories about how traits covary” (Gosling and Vazire, 2002, p. 608). Gosling and Vazire stated that these criteria should be met in order to establish the existence of personality traits and the validity of personality assessment methods. Following this recommendation, the HPQ was developed and tested using these criteria so as to ensure its reliability and validity. It was then demonstrated by Lloyd et al. (2007) that the HPQ did satisfy all three criteria. The use of the HPQ, therefore, allows for a reliable method of horse personality assessment that is also quick and easy to use. Furthermore, the breed differences identified within this study provide further evidence that the HPQ is able to meet Criterion 2, i.e. links with real-world outcomes adding further validity to this assessment method.

### 4.2. Anxiousness and Excitability

The components *Anxiousness* and *Excitability* showed the highest level of variation between breeds and the rankings of breeds on these two components were comparable. The thoroughbred, Arab, and Welsh ponies and cobs were ranked as the top three breeds on both of these components. The results infer that these breeds are behaving significantly more excitably and anxiously than the other breeds included in this study. This is comparable to the results of Hausberger et al. (2004) who, using a bridge test, found that the thoroughbred and the Arab were the most reactive of a sample of 16 horse breeds. The high levels of *Anxiousness* and *Excitability* for these three breeds may be partly attributed to the Arab ancestry of both the thoroughbred and Welsh ponies and cobs (Bowling and Ruvinsky, 2000; Draper, 2001; Foster, 2005).
Partly by using Arab stallions the thoroughbred breed was founded during the 1700s (Bowling and Ruivinsky, 2000; Draper, 2001; Foster, 2005). Similarly, the Welsh mountain pony (Welsh section A) was influenced by the addition of Arab and eastern bloodlines, introduced by the Romans (Draper, 2001; Foster, 2005) and more recently (within the last 200–300 years) through Arab stallions reportedly being allowed to run with free-ranging herds of Welsh mountain ponies (Draper, 2001; Foster, 2005). Welsh cobs and ponies are all descended from the Welsh mountain pony (Welsh section A). Furthermore, the Welsh section B was founded by the crossing of Welsh mountain pony mares with thoroughbred and Arab stallions (Draper, 2001; Foster, 2005). Thus these three breeds have linked ancestry or pedigrees and it seems that this may have resulted in breeds that are still very comparable in their levels of Excitability and Anxiousness.

Hausberger et al. (2004) noted that genetic factors appeared to have great influence on the neophobic responses of horses. Additionally, sire influences have been found in horse emotionality (Wolff et al., 1997; Houpt and Kusunose, 2000) and the tendency to develop stereotypic behaviour (Houpt and Kusunose, 2000). Due to their proposed links with stress (Mills et al., 2002) and therefore anxiety, it is likely that stereotypic behaviours and emotionality are likely to be influenced by the components Anxiousness and Excitability.

The high level of variability on Anxiousness and Excitability, between breeds suggests that artificial selection has been great on these particular characteristics. It would appear that artificial selection has developed breeds that show a range of Excitability and Anxiousness, and are therefore behaviourally tailored for their function. For example, McGreevy and Thomson (2006) note that, for the purposes of racing, thoroughbreds must be highly reactive to stimuli and therefore have heightened flight responses. As a result, they are quick off the starting line. Similarly, it seems likely that draught and multipurpose breeds, such as the Irish draught horse and the Highland pony, would be selected for low levels of Excitability and Anxiousness. The overall greater strength and bulk of such breeds could otherwise make them difficult and dangerous to handle. Therefore selection of appropriate personality types may aid the management and handling of horses and make them more suitable for their relevant functions.

4.3. Sociability and Inquisitiveness

Sociability and Inquisitiveness showed moderately low variability between breeds. Interestingly, the breeds were ranked in the same order for both of these components, with the Arab and thoroughbred ranked highest, and the Irish draught horse and American quarter horse ranked lowest. This similarity may indicate that these two components are genetically linked.

It is possible for one gene to affect several behaviours (pleiotropy), and conversely, that several genes may affect one behaviour (Zuckerman, 1991). Links between different personality constructs have been found in a variety of species. Examples include links between subjective well-being and dominance in chimpanzees (Weiss et al., 2002), boldness and aggression in German shepherd dogs (Strandberg et al., 2005) and between exploratory and agonistic behaviours in great tits (Carere et al., 2005). The length of reproductive cycle and time to reach maturity make heritability studies difficult to carry out on horses. Some research has, however, identified sire effects on horse behaviour (Wolff et al., 1997; Houpt and Kusunose, 2000). The results of the present study indicate a potential link between Sociability and Inquisitiveness, which may warrant more detailed research using heritability techniques.

The lower variability between breeds on these components indicates that the process of artificial selection has influenced these characteristics less than those of Anxiousness and
Excitability. Although Sociability may be of importance in terms of the ease of housing horses together, it seems less likely to be directly selected for. The opportunistic element of Inquisitiveness may in some cases be a disadvantage, in that highly inquisitive horses may be more likely to escape, resulting in a general trend towards selecting for low Inquisitiveness. Horses with higher levels of Inquisitiveness may, however, be selected for cross-country trials where a quick-witted and opportunistic horse would be better able to cope with the complicated elements of the course. Ranked second highest on Inquisitive, the thoroughbred and its crosses are regularly used for this event (Bowling and Ruvinsky, 2000; Draper, 2001). Further research could explore the personality of performance horses such as these, to investigate the personality types of successful versus unsuccessful horses.

4.4. Dominance and Protection

The average scores for Dominance for all breeds were negative, indicating that in general individuals were receiving high scores on the more desirable traits (reliable, subordinate and equable). The variation between breeds on this component was low, with most significant differences occurring between those breeds at opposite ends of the ranking scale. The thoroughbred and Welsh ponies and cobs were ranked highest and the Shetland pony and Irish draught horse were ranked as the lowest on this component.

Low levels of variance between breeds were also shown on the component Protection. The average scores for all breeds were high indicating that all breeds showed high levels of Protection. The breeds found to be most protective were the Arab and the Irish draught horse and the least protective were the thoroughbred, American quarter horse and the Welsh ponies and cobs.

The low levels of variance between breeds on Dominance and Protection may be attributed to low levels of genetic variation on these components. The heritability of Protection or similar components has not yet been studied. Research on Dominance in dogs (Strandberg et al., 2005) and chimpanzees (Weiss et al., 2000; Weiss et al., 2002) has, however, identified that Dominance is heritable in these species. If these components are heritable in horses then it is possible that Dominance and Protection may have been uniformly selected through artificial selection. Such that low levels of Dominance and high levels of Protection would be desirable in all horse breeds, thus aiding management of the species by creating handleable animals that were also good breeders. The selection for low Dominance is not unique to horses, and is part of the general domestication process. Fraser and Broom (1997), for example, noted the importance of the human caretaker being dominant in those species that have a dominant-subordinate type of social structure, especially when the animals can be potentially dangerous as adults.

It is interesting to note that the rank order of breeds on Protection is noticeably different when compared to rank orders on the other components. The breeds thoroughbred, Arab and Welsh ponies and cobs are regularly seen clumped together on the other five components, and although not statistically similar in all cases, they group at the same ends of the rankings scales. On Protection, however, Arabs break away from this group and rank highest, whereas the Welsh ponies and cobs are ranked lowest and the thoroughbred ranked third lowest. Given the pedigrees of these breeds and their apparent similarity on the other components, their segregation on Protection was not expected. This separation could be suggestive of a maternal effect and it would be interesting to investigate why this division has occurred. The majority of Arab influence on both the thoroughbred and the Welsh ponies and cobs has reportedly been as a result of stallions being put to native mares, and this sire influence may have affected the scores for the
other five components. As Protection has a mothering and nurturing aspect, perhaps the maternal influence (genetic and environmental) is greater than that of the sire. Maternal effects have been found to have an effect on some behaviours (McAdam et al., 2002), for example strong maternal influences were found in dominant-aggressive behaviour in the English cocker spaniel (Pérez-Guisado et al., 2006). Further research should look towards exploring maternal influences, both genetic and environmental, on this component.

4.5. Breed typical personalities

The results from the present study support the beliefs held by many equine enthusiasts that horse breeds do differ in their typical personalities. Furthermore, many of the traditional views of the breeds assessed have also been supported.

Hayes (1998) conducted a survey of 50 veterinarians and trainers, asking for comments on 10 breeds for six characteristics. These were trainability, work ethic, temperament, ‘when asked to do something the horse does not want to do’, response to pain, fearfulness and flight. Breeds that were included in both the present study and Hayes (1998) were appaloosa, Arab, American quarter horse and thoroughbred. The descriptions of all four of these breeds by Hayes match very well to the results of the present study. For example, the appaloosa was found by Hayes to be easy going and low on both fearfulness and flight. The present study found the appaloosa to have moderate to low scores on all of the components compared to the other breeds and thus supports Hayes’ description. Additionally, Hayes described the Arab as a fast learner, energetic, playful and reactive for both fearfulness and flight, this is comparable to the results of the present study, where the Arab, compared to the other seven breeds, had high scores on five components and moderate on Dominance.

The results also compare well to the society descriptions of the breeds. For example, the Irish draught horse was described as an intelligent breed with a gentle nature, docility and sense (Irish Draught Horse Society of Great Britain, 2006), and the Highland pony was described as having a ‘kindly nature and even temperament’ (Highland Pony Society, 2006). Both of these breeds scored low on all of the components except Protection, where they scored very highly, thus providing support for these claims.

5. Conclusions

The results of this study have provided further evidence for breed typical personalities and is supported by findings of other studies (Hausberger and Muller, 2002; Hausberger et al., 2004). Breed differences and the similarity of personality between breeds that have linked ancestry provides further support for the inheritance of behaviour and raises questions about maternal and paternal effects on inheritance of behaviour and personality in horses. It is hoped that these results will spark further research on the heritability of horse personality and behaviour.

The findings of this study and others that explore behavioural differences between breeds should be made available to horse owners and handlers. Information regarding a breed’s typical behaviour and personality may allow for more informed decisions during the selection of horses for both leisure riding and other areas of equitation.

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Appendix A

Behavioural definitions of personality adjectives (traits) used in the Horse Personality Questionnaire (adapted from Lloyd et al., 2007).

<table>
<thead>
<tr>
<th>Personality adjective (Trait)</th>
<th>Behavioural definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>aActive</td>
<td>Moves around a lot, does not like being still for long</td>
</tr>
<tr>
<td>aAggressive</td>
<td>Causes harm or potential harm to other individuals, both horse and human</td>
</tr>
<tr>
<td>aApprehensive</td>
<td>Seems to be anxious about everything, fears or avoids any kind of risk</td>
</tr>
<tr>
<td>aCurious</td>
<td>Readily explores new situations</td>
</tr>
<tr>
<td>aEccentric</td>
<td>Shows stereotypies, unusual mannerisms and exaggerated behaviour</td>
</tr>
<tr>
<td>aEffective</td>
<td>Gets own way, can control others, fairly dominant individual</td>
</tr>
<tr>
<td>aEquable</td>
<td>Reacts to others in an even, calm way; not easily disturbed</td>
</tr>
<tr>
<td>aExcitable</td>
<td>Over reacts to any change, easily excited, highly strung</td>
</tr>
<tr>
<td>aFearful</td>
<td>Retreats readily from others or from outside disturbances</td>
</tr>
<tr>
<td>aInsecure</td>
<td>Hesitates to act alone; seeks reassurance from others</td>
</tr>
<tr>
<td>aIrritable</td>
<td>Reacts negatively with little provocation</td>
</tr>
<tr>
<td>aMotherly</td>
<td>Provides warm receptive secure base for others, is tender and caring</td>
</tr>
<tr>
<td>aOpportunistic</td>
<td>Seizes a chance as soon as it arises</td>
</tr>
<tr>
<td>aPlayful</td>
<td>Initiates play and joins in when play is solicited</td>
</tr>
<tr>
<td>aPopular</td>
<td>Sought out as a companion by others</td>
</tr>
<tr>
<td>aProtective</td>
<td>Prevents harm or possible harm to others</td>
</tr>
<tr>
<td>aSlow</td>
<td>Moves and rests in a relaxed manner, moves slowly and deliberately, not easily hurried</td>
</tr>
<tr>
<td>aSociable</td>
<td>Seeks companionship of others</td>
</tr>
<tr>
<td>aSubordinate</td>
<td>Gives in readily to others, submits easily and does not put up a fight to defend self</td>
</tr>
<tr>
<td>aTense</td>
<td>Shows restraint in posture and movement; carries the body stiffly, which suggests a shrinking tendency, as if to pull back and be less conspicuous</td>
</tr>
<tr>
<td>aUnderstanding</td>
<td>Responds in a discriminating and appropriate manner to the behaviour of others</td>
</tr>
<tr>
<td>aSuspicious</td>
<td>Does not trust others readily (human and horse), trusts few individuals</td>
</tr>
<tr>
<td>aReliable</td>
<td>Can be trusted to do things or behaves well, might also be considered a safe horse to be with</td>
</tr>
<tr>
<td>aStubborn</td>
<td>Does not give in easily, not very cooperative</td>
</tr>
<tr>
<td>aIntelligent</td>
<td>Learns new things easily/fast benefits from mental stimulation</td>
</tr>
</tbody>
</table>

a Adapted from Stevenson-Hinde et al. (1980).
b Adjectives derived from Morris et al. (2002).
c Adjectives derived from behavioural terms. Each individual rated on a scale from one to seven on each trait.

References


